```
Set      Items      Description
S1        1697      GARBAGE(2N)COLLECT? OR AUTOMAT?(2N)MEMOR???(2N)MANAG?
S2          10      (CALL()STACK? ? OR REGISTER? ?)(10N)HEAP
S3          57      (POINTER? ? OR IDENTIF???? OR IDENTIFICATION OR ADDRESS???
             OR MAP????)(7N)HEAP
S4           8      (POINTER? ? OR IDENTIF???? OR IDENTIFICATION OR ADDRESS???
             OR MAP????)(7N)(CALL()SITE? ?)
S5         392      DESCRIPTOR? ?(10N)(STACK()FRAME? ? OR REGISTER? ? OR TABLE?
             ? OR OFFSET? ? OR OFF()SET? ?)
S6        2096      (OFFSET? ? OR OFF()SET? ?)(7N)(POINTER? ? OR IDENTIF???? OR
             IDENTIFICATION OR ADDRESS??? OR MAP???? OR HEAP? ? OR STACK(-
             )FRAME? ?)
S7          50      CALL()STACK? ?
S8          33      CALL()SITE? ?
S9           0      FIRST()CALL()SITE? ?
S10       2608      DESCRIPTOR? ?
S11       3722      HEAP? ?
S12     144339      OFFSET? ? OR OFF()SET? ?
S13        152      STACK()FRAME? ?
S14          0      S1 AND S2
S15         14      S1 AND S3
S16          0      S1 AND S4
S17          0      S1 AND S5
S18          2      S1 AND S6
S19          2      S1 AND S7
S20          0      S1 AND S8
S21          1      S1 AND S10
S22        105      S1 AND S11
S23         10      S1 AND S12
S24          3      S1 AND S13
S25         29      S15 OR S18:S19 OR S21 OR S23:S24
```

25/5/1   (Item 1 from file: 347)

07059773   **Image available**
METHOD FOR FORMING ATTACHMENT FORM FOR **GARBAGE** **COLLECTION** AND
ATTACHMENT FORM FOR **GARBAGE** **COLLECTION** FORMED BY THE METHOD

PUB. NO.:   2001-287410 [JP 2001287410 A]
PUBLISHED: October 16, 2001 (20011016)
INVENTOR(s):   YAMANO YUUKO
APPLICANT(s): TOPPAN PRINTING CO LTD
APPL. NO.:   2000-104526 [JP 2000104526]
FILED: April 06, 2000 (20000406)
INTL CLASS: B41J-003/54; B41J-002/475; G09F-003/00; G09F-003/02;
               G09F-003/03

ABSTRACT
PROBLEM TO BE SOLVED: To provide a method for forming attachment forms for
garbage **collection** of even a small lot at low costs in a short time
before delivery date.

SOLUTION: According to this method for forming attachment forms for
garbage **collection** , a fixed information-printing part for front faces
and attaching seals prints by a printing unit 22 of a plate system such as
an **offset** system or the like, and a variable information-printing part
prints by a printer 24 without a plate such as an ink-jet system or the
like connected to a computer 25.

25/5/2   (Item 2 from file: 347)

03677238   **Image available**
ACCESSABLE OBJECT DECIDING MEANS FOR **GARBAGE** **COLLECTION** SYSTEM

PUB. NO.:   04-042338 [JP 4042338 A]
PUBLISHED: February 12, 1992 (19920212)
INVENTOR(s):   YASUMATSU KAZUKI
APPLICANT(s): FUJI XEROX CO LTD [359761] (A Japanese Company or
               Corporation), JP (Japan)
APPL. NO.:   02-149285 [JP 90149285]
FILED: June 07, 1990 (19900607)
INTL CLASS: [5] G06F-012/00; G06F-009/44
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units); 45.1
               (INFORMATION PROCESSING -- Arithmetic Sequence Units)
JOURNAL: Section: P, Section No. 1358, Vol. 16, No. 220, Pg. 5, May
               22, 1992 (19920522)

ABSTRACT
PURPOSE: To attain the **garbage** **collection** with high efficiency by
shifting an object within a **heap** area after rewriting the value of a
pointer to the **heap** area.
CONSTITUTION: The indirect reference is given to an object included in a
heap area 3 from an area different from the area 3 via an object table 4
storing a pointer to the object. Therefore the area including the object
exists in a data area 1, for example, and is not dependent on the pointer
corresponding to the data having the possibility of a pointer for reference
to the object in the area 3. Thus the object can be shifted with rewrite of
the value of the pointer included in the table 4. As a result, the **garbage**
can be **collected** with high efficiency in combination with the copy type
garbage **collection** .

25/5/3   (Item 3 from file: 347)

02714746   **Image available**
GARBAGE   COLLECTION PROCESSING SYSTEM

PUB. NO.:   01-012346 [JP 1012346 A]
PUBLISHED: January 17, 1989 (19890117)
INVENTOR(s):   HAYASHI KOJI
                SATO TAKESHI
APPLICANT(s):   FUJITSU LTD [000522] (A Japanese Company or Corporation), JP
                (Japan)
APPL. NO.:   62-168421 [JP 87168421]
FILED: July 06, 1987 (19870706)
INTL CLASS: [4] G06F-012/02; G06F-009/44
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units); 45.1
                (INFORMATION PROCESSING -- Arithmetic Sequence Units)
JOURNAL: Section: P, Section No. 865, Vol. 13, No. 185, Pg. 38, May
                02, 1989 (19890502)

ABSTRACT
PURPOSE: To collect the areas of data allocated to a 1st-order heap
comprehensively at the time of completing the declaration of usage, by
separating the data used in the execution of a program to a permanent heap
and the 1st-order heap.

CONSTITUTION: A temporary heap 19 to which the data used transiently is
allocated is provided other than the permanent heap 20. The permanent heap
20 becomes the object of **collection** by a **garbage collector** 18, and
the data use for a comparatively long time is allocated to the **heap** . A
pointer switching part 16, when detecting an **identifier** which uses the
temporary **heap** 19, controls following data so as to be allocated from the
temporary heap 19. A temporary heap collection processing part 17 collects
the area of the temporary heap 19 used transiently and unrequired by
returning a data allocation pointer to its original position at the time of
completing the usage.

 25/5/4   (Item 4 from file: 347)

02636545   **Image available**
METHOD AND SYSTEM FOR IMPROVING DATA STORING EFFICIENCY

PUB. NO.:   63-253445 [JP 63253445 A]
PUBLISHED: October 20, 1988 (19881020)
INVENTOR(s):   ROBAATO AREN SHIYOU
APPLICANT(s):   YOKOGAWA HEWLETT PACKARD LTD [355232] (A Japanese Company or
                Corporation), JP (Japan)
APPL. NO.:   63-064948 [JP 8864948]
FILED: March 18, 1988 (19880318)
PRIORITY: 7-28,808 [US 28808-1987], US (United States of America),
                March 20, 1987 (19870320)
INTL CLASS: [4] G06F-012/02
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units)
JOURNAL: Section: P, Section No. 828, Vol. 13, No. 66, Pg. 40,
                February 15, 1989 (19890215)

ABSTRACT
PURPOSE: To **collect** the **garbage** in a system including a virtual memory
with minimum deterioration of the system performance by reducing the scales
of the collectable heaps and a base set.

CONSTITUTION: A system is comprised of a primary storage device containing
a base set region and a **heap** region, a dirty page **map** of the primary
storage device, a secondary storage device, a dirty page map of the
secondary storage device, a valid base set reduction means which responds

to both dirty page maps of the primary and secondary storage devices, a **garbage collection** means which deletes the data receiving no reference out of the heaps in response to the base set reduced effectively, etc. Then the dirty page information is cleared 10 and the new numerical value is stored in a storage device via the user calculation. The dirty bits are set 12 and the pages containing the base sets to which the dirty page maps are written are discriminated 14. Then the dirty page information is cleared 18 and the **garbage** are **collected** 20 via the written base set pages. Finally a program of a flow returning to the step 12 is used.

25/5/5   (Item 5 from file: 347)
DIALOG(R)File 347:JAPIO
(c) 2004 JPO & JAPIO. All rts. reserv.

02445153   **Image available**
GARBAGE   COLLECTION PROCESSING SYSTEM

ABSTRACT
PURPOSE: To perform the **garbage collection** in an area of an instruction code by using a means which calculates the address displacement from the head address of the calling side and the address of a resetting destination.

CONSTITUTION: When a function calling part 10 calls a function part 11, the head address A of the part 10 serving as the calling side is stored in a head address memory part 13. While a resetting destination address R is stored in a resetting destination address memory part 14. If the **garbage collection** is carried out during execution of the called part 11, an **offset** setting part 16 of a **garbage collection** part 15 tracks all places storing addresses R and replaces the address R with a displacement (R-A) from the head address. When the **garbage collection** is carried out, a shift destination address setting part 17 replaces the contents of the part 13 with an address A1 of a new shift destination. Then a resetting destination address correcting part 18 adds A1 to the contents (R-A) of the part 14 for replacement with a new resetting destination address R1.

25/5/6   (Item 6 from file: 347)
DIALOG(R)File 347:JAPIO
(c) 2004 JPO & JAPIO. All rts. reserv.

02383848   **Image available**
GARBAGE   COLLECTOR

ABSTRACT

PURPOSE: To prevent excessive memory areas from being consumed by providing
an overflow flag to a multi-reference table and storing a reference count
value equal to the overflow amount of a cell where the overflow flag is set
in an area shown by a memory address given from a certain base which
defines the value of a reference counter as an **offset** value.

CONSTITUTION: An overflow flag 7 is added to a multi-reference table. Then
the reference count value equal to the overflow amount of the cell where
the flag 7 is set is stored in an area shown by the memory address given
from a certain base which defines the value of a reference counter 6 as the
 offset value. Thus it is not needed to secure a reference counter having
the largest conceivable scale on a MRT 3 and the minimum necessary area
suffices. Thus the excessive memory capacity is not consumed.

   25/5/7   (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

016320932
WPI Acc No: 2004-478827/200445
XRPX Acc No: N04-377523
   **Computer configuration method for reclamation of memory space, involves
   assigning values associated with respective interpretations, to
   respective locator entries associated with cards**
Patent Assignee: DETLEFS D L (DETL-I)
Inventor: DETLEFS D L
Number of Countries: 001   Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20040111718	A1	20040610	US 2002309910	A	20021204	200445	B

Priority Applications (No Type Date): US 2002309910 A 20021204
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20040111718	A1		17	G06F-009/45	

Abstract (Basic): US 20040111718 A1
       NOVELTY - The values associated with respective interpretations,
   are assigned to respective locator entries associated with cards. The
   location of a block containing start of a given card associated with a
   given entry, is determined from the entry associated with the card
   located after specific number of cards to left of the given card. The
   number is a function of the locator value associated with the given
   entry
       DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
   following:
       (1) computer system;
       (2) storage medium containing instructions to configure computer;
       (3) electromagnetic signal representing sequences of instructions
   to configure computer;
       (4) **garbage collector** .
       USE - For configuring computer to operate as **garbage collector**
   (claimed) for reclamation of memory space.
       ADVANTAGE - The cost required for block- **offset** table maintenance
   and for finding blocks location are reduced.
       DESCRIPTION OF DRAWING(S) - The figure shows a block diagram
   explaining basic functions of compiler.
       pp; 17 DwgNo 2/6
Title Terms: COMPUTER; CONFIGURATION; METHOD; RECLAIM; MEMORY; SPACE;
   ASSIGN; VALUE; ASSOCIATE; RESPECTIVE; RESPECTIVE; LOCATE; ENTER;
   ASSOCIATE; CARD
Derwent Class: T01
International Patent Class (Main): G06F-009/45

International Patent Class (Additional): G06F-009/44
File Segment: EPI

 25/5/8   (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

016080187   **Image available**
WPI Acc No: 2004-238048/200422
XRPX Acc No: N04-188750
   Java programming language source-instruction executor for computer
   system, causes garbage collector **to promote pinned object from young**
   to old generation if mutators reaches unpinning point assignment to
   pinned object allocation
Patent Assignee: CLINGER W D (CLIN-I); DETLEFS D L (DETL-I)
Inventor: CLINGER W D; DETLEFS D L
Number of Countries: 001 Number of Patents: 001
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
US 20040039759 A1   20040226 US 2002405485   P   20020823 200422 B
                                US 2002295325   A   20021115

Priority Applications (No Type Date): US 2002405485 P 20020823; US
   2002295325 A 20021115
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
US 20040039759 A1   22 G06F-017/30   Provisional application US 2002405485
Abstract (Basic): US 20040039759 A1
       NOVELTY - The executor causes an allocation of an initially pinned
   object to occur in a young generation (50). Write operation to the
   objects reference field is performed with and without a write barrier
   if operation occurs before and after unpinning point assignment,
   respectively. A **garbage collector** promotes the object from young to
   old generation if the object meets promotion criteria that the mutators
   have reached the assignment.
       DETAILED DESCRIPTION - The executor runs a mutator and a **garbage**
   collector to manage a heap of an object to organize it into young and
   old generations and relies on result of write-barrier execution to keep
   track of references located in the old generation but not in the young
   generation. Respective unpinning point in a mutator is assigned to the
   allocation.
       INDEPENDENT CLAIMS are also included for the following:
       (1) a method for executing a mutator that dynamically allocates in
   a heap of objects
       (2) a storage medium containing instructions readable by a computer
   to operate as a source-instruction executor
       (3) a computer signal representing sequence of instructions causing
   to operate as a source-instruction executor
       (4) a means-plus-function that receives source code that specifies
   operation of a mutator.
       USE - Used for executing a Java programming language
   source-instruction for computer system.
       ADVANTAGE - The **garbage collector** avoids promoting an object
   out of the young generation until the mutator has passed the point
   where it executes such write operations without write barriers, thereby
   causing no reference writing in old-generation objects without
   accompanying write barriers.
       DESCRIPTION OF DRAWING(S) - The drawing shows selected parts of a
   memory space used by a process that employs a **garbage collected**
   heap.
       Heap (10)
       Young generation (50)
       Old generation (52)
        Call   stack (54)
       Static-variable segment (58)
       pp; 22 DwgNo 4/12
Title Terms: PROGRAM; LANGUAGE; SOURCE; INSTRUCTION; COMPUTER; SYSTEM;

CAUSE; GARBAGE; COLLECT; PROMOTE; PIN; OBJECT; YOUNG; GENERATE; REACH;
UNPIN; POINT; ASSIGN; PIN; OBJECT; ALLOCATE
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI

25/5/9   (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

015724288   **Image available**
WPI Acc No: 2003-786488/200374
XRPX Acc No: N03-630233
  **Memory management facilitation method in computer, involves selectively
  invoking transition function to maintain traceable path of select pointer
  and state information across** call   stack , **to non-** garbage   collected
  program components
Patent Assignee: MICROSOFT CORP (MICT)
Inventor: TARDITI D R
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6625808	B1	20030923	US 99459241	A	19991210	200374	B

Priority Applications (No Type Date): US 99459241 A 19991210
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6625808	B1		18	G06F-009/45	

Abstract (Basic): US 6625808 B1
      NOVELTY - The transition points between a garbage and non- **garbage
  collected** program components of a heterogeneous program, is
  identified. A transition function is selectively invoked to maintain
  the traceable path of select pointer and state information across the
  call   stack , to the non- **garbage   collection** throughout the
  execution of the heterogeneous program.
      DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
  following:
      (1) native code compiler;
      (2) run time environment for implementing memory management
  facilitation method;
      (3) storage medium for storing memory management facilitation
  program;
      (4) heterogeneous program compilation method;
      (5) storage medium for storing heterogeneous program compilation
  program; and
      (6) heterogeneous program compilation program.
      USE - For facilitating the management of memory which stores the
  code of a legacy programming language e.g. Pascal FORTRAN and C
  language in a computer.
      ADVANTAGE - **Automatically** facilitates the **memory   management**
  among the heterogeneous components of a computer program. Since the
  traceable path of a select pointer and state information are maintained
  to a non- **garbage   collected** program component, the non- garbage
  component efficiently supports the execution of garbage component of
  the heterogeneous program.
      DESCRIPTION OF DRAWING(S) - The figure shows the flowchart
  explaining the heterogeneous program compilation process.
      pp; 18 DwgNo 5/10
Title Terms: MEMORY; MANAGEMENT; FACILITATE; METHOD; COMPUTER; SELECT;
  INVOKE; TRANSITION; FUNCTION; MAINTAIN; TRACE; PATH; SELECT; POINT; STATE
  ; INFORMATION; CALL; STACK; NON; GARBAGE; COLLECT; PROGRAM; COMPONENT
Derwent Class: T01
International Patent Class (Main): G06F-009/45
File Segment: EPI

DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

015148907   **Image available**
WPI Acc No: 2003-209434/200320
XRPX Acc No: N03-166949
  References tracking method in object oriented programming environments,
  involves storing reference value for objects in execution stack, in
  reference stack at same offset **level as that in execution stack**
Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: SOKOLOV S; WALLMAN D
Number of Countries: 100 Number of Patents: 003
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020169556	A1	20021114	US 2001851663	A	20010508	200320	B
WO 200291189	A2	20021114	WO 2002US14583	A	20020508	200320	
GB 2391981	A	20040218	WO 2002US14583	A	20020508	200413	
			GB 200325831	A	20031105		

Priority Applications (No Type Date): US 2001851663 A 20010508
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020169556	A1		15	G06F-019/00	
WO 200291189	A2	E		G06F-012/02	

    Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA
    CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN
    IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ
    OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA
    ZM ZW
    Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR
    IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW

| GB 2391981 | A | | | G06F-012/02 | Based on patent WO 200291189 |

Abstract (Basic): US 20020169556 A1
     NOVELTY - A reference stack is associated with an execution stack
(106) of same size and the objects in the execution stack, for which a
reference value is to be stored in the reference stack is determined. A
reference value corresponding to the determined objects is stored in
the reference stack in the same **offset** level as that in the execution
stack.
     DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the
following:
     (1) Reference stack; and
     (2) Method for identifying references to Java objects.
     USE - For tracking references in object oriented programming
environment like Java programming environment used in pagers, cell
phones, smart cards, super computers, embedded systems, for **garbage**
collection .
     ADVANTAGE - Since the reference value corresponding to objects in
execution stack is stored in same **offset** as that in execution stack,
the entries in the reference stack can be checked against corresponding
entries in execution stack to ensure greater degree of certainty that
the identified entries represent references to active Java objects.
     DESCRIPTION OF DRAWING(S) - The figure shows a computing
environment suitable for Java objects.
     Execution stack (106)
     pp; 15 DwgNo 1/8
Title Terms: REFERENCE; TRACK; METHOD; OBJECT; ORIENT; PROGRAM; ENVIRONMENT
  ; STORAGE; REFERENCE; VALUE; OBJECT; EXECUTE; STACK; REFERENCE; STACK;
  OFFSET ; LEVEL; EXECUTE; STACK
Derwent Class: T01
International Patent Class (Main): G06F-012/02; G06F-019/00
File Segment: EPI

DIALOG(R)File 350:Derwent WPIX

014852797   **Image available**
WPI Acc No: 2002-673503/200272
XRPX Acc No: N02-532450
   Memory reclamation method for computer system, involves creating local
   object on local heap of memory, using source code corresponding to
   address , when address of next source code is in data structure
Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: WALLMAN D
Number of Countries: 097 Number of Patents: 004
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020087589	A1	20020704	US 2000752886	A	20001228	200272	B
WO 200254249	A1	20020711	WO 2001US42056	A	20010905	200272	
GB 2388685	A	20031119	WO 2001US42056	A	20010905	200401	
			GB 200312812	A	20030604		
AU 2001291294	A1	20020716	AU 2001291294	A	20010905	200427	

Priority Applications (No Type Date): US 2000752886 A 20001228
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020087589	A1		15	G06F-017/30	
WO 200254249	A1	E		G06F-012/02	

   Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA
   CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN
   IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ
   PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
   Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR
   IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

| GB 2388685 | A | | | G06F-012/02 | Based on patent WO 200254249 |
| AU 2001291294 | A1 | | | G06F-012/02 | Based on patent WO 200254249 |

Abstract (Basic): US 20020087589 A1
       NOVELTY - A data structure including addresses of source codes used
   for creating local objects, is obtained. When the address of next
   source code is determined to be in the data structure, a local object
   is created on a local heap of memory, using the source code associated
   with the address, such that the local objects are stored in a memory
   separately from non-local objects.
       DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the
   following:
       (1) Computer-readable recorded medium storing memory reclamation
   program; and
       (2) Memory reclaiming apparatus.
       USE - For computer software e.g. Java platform.
       ADVANTAGE - Efficiency of reclamation of memory associated with
   various types of objects no longer in use, is greatly improved, without
   performing explicit **garbage   collection** .
       DESCRIPTION OF DRAWING(S) - The figure shows the flowchart
   illustrating the memory reclamation method.
       pp; 15 DwgNo 5/9
Title Terms: MEMORY; RECLAIM; METHOD; COMPUTER; SYSTEM; LOCAL; OBJECT;
   LOCAL; HEAP; MEMORY; SOURCE; CODE; CORRESPOND; ADDRESS; ADDRESS; SOURCE;
   CODE; DATA; STRUCTURE
Derwent Class: T01
International Patent Class (Main): G06F-012/02; G06F-017/30
File Segment: EPI

 25/5/12   (Item 6 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014736448   **Image available**
WPI Acc No: 2002-557152/200259
XRPX Acc No: N02-441060
   Java language string object storing method in object oriented computer

programming system, involves identifying string object from table of
several objects for creation and storage of string object in fixed area
of heap
Patent Assignee: SUN MICROSYSTEMS INC (SUNM); SOKOLOV S (SOKO-I); WALLMAN
D (WALL-I)
Inventor: SOKOLOV S; WALLMAN D
Number of Countries: 097 Number of Patents: 004
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020073404	A1	20020613	US 2000736655	A	20001212	200259	B
WO 200257913	A2	20020725	WO 2001US51266	A	20011026	200259	
US 6681234	B2	20040120	US 2000736655	A	20001212	200407	
AU 2002243435	A1	20020730	AU 2002243435	A	20011026	200427	

Priority Applications (No Type Date): US 2000736655 A 20001212
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020073404	A1		7	G06F-009/44	
WO 200257913	A2	E		G06F-009/44	

    Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA
    CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN
    IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ
    PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
    Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR
    IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

| US 6681234 | B2 | | | G06F-017/30 | |
| AU 2002243435 | A1 | | | G06F-009/44 | Based on patent WO 200257913 |

Abstract (Basic): US 20020073404 A1
        NOVELTY - A fixed area of heap not subjected to garbage
    collection and for collection of Java language string objects is
    allocated. A request to create Java language string object is received.
    The string object is created and stored in fixed area of heap , if the
    object is identified in the table of string objects. The string
    object is stored in garbage area of heap, if the object to be created
    is not identified in the table.
        DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the
    following:
        (1) Storage medium storing string objects storing program; and
        (2) String objects storing apparatus.
        USE - For storing Java language string objects created during
    initialization of virtual machine within an object oriented computer
    programming system.
        ADVANTAGE - The waste of resources produced by the garbage
    collector operating on objects never to be deleted is eliminated by
    the placing of non-identified string objects in garbage area. Thereby
    the processing time is reduced.
        DESCRIPTION OF DRAWING(S) - The figure shows the flowchart
    explaining the process of creating string objects during initialization
    of virtual machine.
        pp; 7 DwgNo 3/3
Title Terms: LANGUAGE; STRING; OBJECT; STORAGE; METHOD; OBJECT; ORIENT;
  COMPUTER; PROGRAM; SYSTEM; IDENTIFY; STRING; OBJECT; TABLE; OBJECT;
  CREATION; STORAGE; STRING; OBJECT; FIX; AREA; HEAP
Derwent Class: T01
International Patent Class (Main): G06F-009/44; G06F-017/30
File Segment: EPI

 25/5/13   (Item 7 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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013539562   **Image available**
WPI Acc No: 2001-023768/200103
Related WPI Acc No: 1997-470778
XRPX Acc No: N01-018519
  Refuse handling assembly for garbage   collection vehicle has refuse

container pivoted to support frame such that it is movable between
lowered position and tilted position which centers at pivot mounting
Patent Assignee: GARWOOD INT PTY LTD (GARW-N)
Inventor: DE VRIES P; HORROCKS D J; HOUSTON M A; MCHUGH L J; OMMUNDSON B J
Number of Countries: 001   Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6149371	A	20001121	WO 97AU138	A	19970306	200103	B
			US 98152522	A	19980914		

Priority Applications (No Type Date): AU 982513 A 19980320; AU 968637 A
19960312; AU 962280 A 19960912
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6149371	A		13	B65F-003/20	CIP of application WO 97AU138

Abstract (Basic): US 6149371 A
        NOVELTY - A refuse container (20) is pivoted to a support frame
(14) such that it is movable between a lowered position and a tilted
position which centers at a pivot mounting (16). A compactor (25) which
includes a sweep blade (47) is disposed at a delivery inlet opening
(21) formed to the bottom wall of the refuse container. The pivot axis
of the blade is laterally **offset** from longitudinal axis of container.
        DETAILED DESCRIPTION - The support frame forms part of the vehicle
chassis (110) and includes a mounting section (13) which extends
upwardly from the base (115) of the vehicle chassis. The other support
frame section (14) extends upwardly from the mounting section with free
end disposed rearwardly.
        USE - For use with **garbage collection** vehicle.
        ADVANTAGE - Small to enable effective collection of refuse from
inaccessible area and transfer collected refuse appropriately to the
refuse collecting vehicle.
        DESCRIPTION OF DRAWING(S) - The figure shows a schematic side
elevation of the vehicle with a refuse handling assembly.
        Support frame (14)
        Pivot mounting (16)
        Refuse container (20)
        Delivery inlet opening (21)
        Compactor (25)
        Sweep blade (47)
        pp; 13 DwgNo 1/7
Title Terms: REFUSE; HANDLE; ASSEMBLE; GARBAGE; COLLECT; VEHICLE; REFUSE;
  CONTAINER; PIVOT; SUPPORT; FRAME; MOVE; LOWER; POSITION; TILT; POSITION;
  PIVOT; MOUNT
Derwent Class: Q35
International Patent Class (Main): B65F-003/20
File Segment: EngPI

 25/5/14   (Item 8 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

013466552   **Image available**
WPI Acc No: 2000-638495/200061
XRPX Acc No: N00-473580
  Concurrently executed instruction scheduling method for garbage
  collection **in VLIW processor by interleaving instructions of generated
  data structures linked by** identifying pointers **in memory** heap **and**
  garbage   collection **process**
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG)
Inventor: HOULDSWORTH R J
Number of Countries: 025   Number of Patents: 007
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200060469	A1	20001012	WO 2000EP2077	A	20000309	200061	B
EP 1082662	A1	20010314	EP 2000912579	A	20000309	200116	
			WO 2000EP2077	A	20000309		
KR 2001025111	A	20010326	KR 2000713525	A	20001130	200161	

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CN 1306644      A   20010801  CN 2000800918  A   20000309  200172
TW 473663       A   20020121  TW 2000104709  A   20000315  200308
JP 2002541551   W   20021203  JP 2000609892  A   20000309  200309
                              WO 2000EP2077  A   20000309
US 6526421      B1  20030225  US 2000537822  A   20000329  200323
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Priority Applications (No Type Date): GB 997280 A 19990331
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
WO 200060469 A1 E 17 G06F-012/02
    Designated States (National): CN IN JP KR
    Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU
    MC NL PT SE
EP 1082662   A1 E   G06F-012/02   Based on patent WO 200060469
    Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LI
    LU MC NL PT SE
KR 2001025111 A   G06F-012/02
CN 1306644   A   G06F-012/02
TW 473663   A   G06F-012/02
JP 2002541551 W   23 G06F-009/46   Based on patent WO 200060469
US 6526421   B1   G06F-017/30   .

Abstract (Basic): WO 200060469 A1
    NOVELTY - The VLIW processor is divided into instruction slots
    (50-58). The state of the slots is shown at consecutive clock
    cycles/time points (A,B,C). At time point B, instruction (6) cannot be
    executed concurrently with instruction (4) and prevents slot (58) from
    being used.
    DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a
    data processing apparatus, a program of instructions on a storage
    device readable by a machine.
    USE - For **garbage   collection** in VLIW processors.
    ADVANTAGE - There is no drop in the performance of the processor as
    a result of interleaving of instructions from the program and **garbage
    collection** threads because unused concurrent execution resources of
    the processor are utilized for **garbage   collection** without affecting
    the process being executed.
    DESCRIPTION OF DRAWING(S) - The figure shows a representation of a
    VLIW processor executing the instruction.
    Instructions (4,6)
    Instruction Slots (50-58)
    Time Points (A,B,C)
    pp; 17 DwgNo 5/5
Title Terms: CONCURRENT; EXECUTE; INSTRUCTION; SCHEDULE; METHOD; GARBAGE;
  COLLECT; PROCESSOR; INTERLEAVED; INSTRUCTION; GENERATE; DATA; STRUCTURE;
  LINK; IDENTIFY; POINT; MEMORY; HEAP; GARBAGE; COLLECT; PROCESS
Derwent Class: T01
International Patent Class (Main): G06F-009/46; G06F-012/02; G06F-017/30
International Patent Class (Additional): G06F-009/45; G06F-012/00
File Segment: EPI

 25/5/15   (Item 9 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

013465024   **Image available**
WPI Acc No: 2000-636967/200061
XRPX Acc No: N00-472265
   Garbage   collection **assisting method for data processing system,
   involves performing** garbage   collection **in virtual object heap, only
   when total number of objects in virtual object heap has reached threshold**
Patent Assignee: INT BUSINESS MACHINES CORP (IBMC)
Inventor: HUBER G D; MCCAULEY D W
Number of Countries: 001 Number of Patents: 001
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
US 6070173   A   20000530 US 97979595 A   19971126 200061 B

Priority Applications (No Type Date): US 97979595 A 19971126
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
US 6070173   A   9 G06F-017/30

Abstract (Basic): US 6070173 A
        NOVELTY - Objects are allocated within a virtual object heap which
    is larger than a physical object **heap** . An **address** of one of the
    objects within the virtual object **heap** , is translated into a specific
    address located in the physical object **heap** . **Garbage collection**
    is done in the virtual object heap, only when total number of objects
    in the virtual object heap has reached threshold.
        DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for
    garbage collection assisting apparatus.
        USE - For data processing system such as Java virtual machine.
        ADVANTAGE - Since Java objects are optimally placed in physical
    object heap, when being translated from virtual object heap, the
    variations in size and lifetime can quickly fragmentize the system
    memory. The usage of small, uniformly sized object allocation units in
    virtual object **heap** , and the possibility of object portion **mapping**
    between the object heaps, at any available location, helps to maximize
    utilization and re-usage of the system memory. Several small objects
    can be packed into a single object allocation unit to further improve
    utilization of the system memory. An object directory cache may be used
    to hide the object directory lookup under the DRAM RAS access such that
    any access latency penalty associated with object translation, is
    eliminated.
        DESCRIPTION OF DRAWING(S) - The figure shows block diagram of
    object translation system.
        pp; 9 DwgNo 4/4
Title Terms: GARBAGE; COLLECT; ASSIST; METHOD; DATA; PROCESS; SYSTEM;
    PERFORMANCE; GARBAGE; COLLECT; VIRTUAL; OBJECT; HEAP; TOTAL; NUMBER;
    OBJECT; VIRTUAL; OBJECT; HEAP; REACH; THRESHOLD
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI

 25/5/16   (Item 10 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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013243258   **Image available**
WPI Acc No: 2000-415140/200036
XRPX Acc No: N00-310233
   **Multi-threaded processing memory managing by creating object in thread
   heap and monitoring whether object is local root**
Patent Assignee: INT BUSINESS MACHINES CORP (IBMC)
Inventor: KOLODNER E K; TROTTER M J
Number of Countries: 001 Number of Patents: 002
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
GB 2345159   A   20000628   GB 9828298   A   19981223   200036 B
GB 2345159   B   20030820   GB 9828298   A   19981223   200355

Priority Applications (No Type Date): GB 9828298 A 19981223
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
GB 2345159   A   23 G06F-009/44
GB 2345159   B   G06F-009/44

Abstract (Basic): GB 2345159 A
        NOVELTY - The method involves creating an object (18) in thread
    heap (32) using multiples of 8 bytes and monitoring whether the object
    is a local root.
        DETAILED DESCRIPTION - These objects in the **heap** which are not
    identified in the trace or root are not identified as global and are

treated as unused and are scheduled for deletion. During checking a
heap size, if it is not enough of memory, then optionally increase the
size of the hep. If still not enough memory, then full **garbage**
collection is required. INDEPENDENT CLAIMS are included for: a system
for managing memory in multi-thread processing environment and a
computer program product stored on a computer readable medium, which
when executed performs managing memory in multi-thread processing
environment.
    USE - As a memory management in a multithreaded runtime environment
with **garbage** **collection** of storage objects with respect to a local
stack.
    ADVANTAGE - Keeps track of the object references using write
barrier placed in any operation which assigns references e.g. putfield,
putstatic and aastore.
    DESCRIPTION OF DRAWING(S) - The drawing shows a heap scheme
according to the present invention.
    object (18)
    thread heap (32)
    pp; 23 DwgNo 3/6
Title Terms: MULTI; THREAD; PROCESS; MEMORY; MANAGE; OBJECT; THREAD; HEAP;
  MONITOR; OBJECT; LOCAL; ROOT
Derwent Class: T01
International Patent Class (Main): G06F-009/44
File Segment: EPI

 25/5/17   **(Item 11 from file: 350)**
DIALOG(R)File 350:Derwent WPIX
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013084166   **Image available**
WPI Acc No: 2000-256038/200022
XRPX Acc No: N00-190367
  Computer controlled method for localizing nodes in a garbage   collected
   carded heap in a computer memory
Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: KNIPPEL R C; SCHWARTZ D C
Number of Countries: 001 Number of Patents: 001
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
US 6038572   A   20000314 US 97842070   A   19970423 200022 B

Priority Applications (No Type Date): US 97842070 A 19970423
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
US 6038572   A   47 G06F-017/00

Abstract (Basic): US 6038572 A
    NOVELTY - The method involves collecting the first set of nodes to
a card-marked copied generation, and collecting the second set of
remaining nodes to the card-marked copied generation.
    DETAILED DESCRIPTION - The method involves localizing the first set
of nodes in a card-marked older generation **heap** area, in which each
node contains a **pointer** to an **address** of a younger generation **heap**
 area. The card-marked older generation heap area includes the
intermixed nodes of the first and second sets of nodes. INDEPENDENT
CLAIMS are also included for the following:
    (a) the computer controlled system for localizing nodes in **garbage**
  collected carded heap;
    (b) the node localizing apparatus;
    (c) and the computer program product containing the node localizing
instructions.
    USE - For localizing nodes in a **garbage**   **collected** carded heap
in a computer memory. Useful in computer memory allocation and
de-allocation.
    ADVANTAGE - Provides economical method for localizing nodes in a
card marked older generation heap area. Does not need manual operation
since operations in the computer controlled method are performed by

machines. Has improved computational efficiency when determining
reference set of an object by optimizing the gathering of pointer
values that are intermixed with data values in the initiated object.
More efficient since global hash **offset** variable is only updated at
each scavenge instead of being loaded from memory, and stored to memory
during every hash value calculation. Encompasses techniques related to
card marking which is useful in indicating interesting areas of the
heap . Quickly finds nodes that contain **pointers** related to marked
card.
        DESCRIPTION OF DRAWING(S) - The figure shows the process using the
data structures in a memory to locate pointers.
        pp; 47 DwgNo 3/10
Title Terms: COMPUTER; CONTROL; METHOD; NODE; GARBAGE; COLLECT; CARD; HEAP;
  COMPUTER; MEMORY
Derwent Class: T01
International Patent Class (Main): G06F-017/00
File Segment: EPI

  25/5/18   (Item 12 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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012934518   **Image available**
WPI Acc No: 2000-106365/200009
XRPX Acc No: N00-081680
  Stored data object marking in memory compaction and garbage   collection
   procedure executed in real or virtual memory space of data processing
   system
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS AB (PHIG
  ); US PHILIPS CORP (PHIG)
Inventor: HOULDSWORTH R J; MORRIS S
Number of Countries: 022 Number of Patents: 006
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9967697	A2	19991229	WO 99IB1088	A	19990610	200009	B
EP 1036355	A2	20000920	EP 99923792	A	19990610	200047	
			WO 99IB1088	A	19990610		
KR 2001023063	A	20010326	KR 2000701680	A	20000218	200161	
TW 440777	A	20010616	TW 99110319	A	19990621	200203	
US 6393439	B1	20020521	US 99337845	A	19990621	200239	
JP 2002519750	W	20020702	WO 99IB1088	A	19990610	200246	
			JP 2000556294	A	19990610		

Priority Applications (No Type Date): GB 9813266 A 19980620
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9967697	A2	E	20	G06F-000/00	

    Designated States (National): JP KR
    Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU
    MC NL PT SE

EP 1036355	A2	E		G06F-001/00	Based on patent WO 9967697

    Designated States (Regional): DE FR GB

KR 2001023063	A			G06F-012/02	
TW 440777	A			G06F-017/30	
US 6393439	B1			G06F-017/30	
JP 2002519750	W		25	G06F-012/00	Based on patent WO 9967697

Abstract (Basic): WO 9967697 A2
        NOVELTY - A central processor unit (CPU) (10) is coupled via an
    address and data bus (12) to random access and read only memories (RAM,
    ROM) (14,16) and also to user input devices (18,20), while audio output
    is via speakers (22) with an audio processing stage (24) and video
    output is presented on a display screen (26) with a display driver
    stage (28). The process traverses points to detect objects linked to a
    root object and then traverses further points to detect objects linked
    to the detected objects until all **pointers** in the RAM have been
    traversed. Some **heap** objects carry **identifiers** and some, which are
    potentially reachable, are classed as pending, before a final sweep to

mark root objects is made.
       DETAILED DESCRIPTION - AN INDEPENDENT CLAIM is included for a data
processing apparatus.
       USE - Handling of finalization for objects in memory compaction and
   garbage   collection in real or virtual memory space of data
processing apparatus.
       ADVANTAGE - Minimized time to collection for objects whenever
possible.
       DESCRIPTION OF DRAWING(S) - The drawing is a block diagram of a
system suitable to embody the present invention
       CPU (10)
       RAM and ROM (14,16)
       Address and data bus (12)
       User input devices (18,20)
       Speakers (22)
       Display screen (26)
       Audio and video drive stages (24,28)
       pp; 20 DwgNo 1/4
Title Terms: STORAGE; DATA; OBJECT; MARK; MEMORY; COMPACT; GARBAGE; COLLECT
  ; PROCEDURE; EXECUTE; REAL; VIRTUAL; MEMORY; SPACE; DATA; PROCESS; SYSTEM
Derwent Class: T01
International Patent Class (Main): G06F-000/00; G06F-001/00; G06F-012/00;
  G06F-012/02; G06F-017/30
File Segment: EPI

 25/5/19   (Item 13 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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012727579   **Image available**
WPI Acc No: 1999-533692/199945
XRPX Acc No: N99-396397
   Garbage   collection **method implemented by Lisp, Smalltalk and Java -
   involves scanning log buffer which indicates memory cell with heap mark
   and route mark, and releasing memory cells without heap mark and route
   mark**
Patent Assignee: FUJITSU LTD (FUIT)
Number of Countries: 001 Number of Patents: 001
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
JP 11232162   A   19990827 JP 9837018   A   19980219 199945 B

Priority Applications (No Type Date): JP 9837018 A 19980219
Patent Details:
Patent No   Kind Lan Pg   Main IPC   Filing Notes
JP 11232162   A   8 G06F-012/00

Abstract (Basic): JP 11232162 A
       NOVELTY - A heap mark is attached to a memory cell indicated by a
pointer. A route mark is attached to memory cells indicated by a route
 pointer . A log buffer indicates memory cell with **heap** mark and route
mark. While scanning the log buffer, memory cells without heap mark and
route mark are released.
       USE - Implemented in Lisp, Smalltalk and Java for releasing
unnecessary memory.
       ADVANTAGE - Unnecessary memory cells are released easily and
quickly by using stack as route pointer. DESCRIPTION OF DRAWING(S) -
The figure shows **garbage   collection** method.
       Dwg.1/9
Title Terms: GARBAGE; COLLECT; METHOD; IMPLEMENT; SCAN; LOG; BUFFER;
  INDICATE; MEMORY; CELL; HEAP; MARK; ROUTE; MARK; RELEASE; MEMORY; CELL;
  HEAP; MARK; ROUTE; MARK
Derwent Class: T01
International Patent Class (Main): G06F-012/00
File Segment: EPI

DIALOG(R)File 350:Derwent WPIX

012588030   **Image available**
WPI Acc No: 1999-394137/199933
XRPX Acc No: N99-294557
   Computer controlled node specifying method for memory allocation and deallocation
Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: SCHWARTZ D C; WOLCZKO M I
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5915255	A	19990622	US 97842196	A	19970423	199933	B

Priority Applications (No Type Date): US 97842196 A 19970423
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5915255	A		46	G06F-017/30	

Abstract (Basic): US 5915255 A
       NOVELTY - A current validation variable is maintained for link
   referenced area. The variable contains an area validation value
   depending on several scavenge operations. A node is accessed through a
   link containing an **offset** value and a link validation value, into
   link referenced creation area. The node is allocated from generational
   garbage   collected heap.
       DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
   following:
       (a) apparatus for specifying node within creation area;
       (b) computer readable medium storing node specification program
       USE - For referencing active and garbage nodes in creation area of
   heap for memory allocation and deallocation in computer system.
       ADVANTAGE - Avoids need for updating of all references to node when
   node is copied from creation area, allowing copying process to be
   interrupted when resolving links to copied node.
       DESCRIPTION OF DRAWING(S) - The figure illustrates data structures
   in memory and process to locate pointers using data structures.
       pp; 46 DwgNo 3A/10
Title Terms: COMPUTER; CONTROL; NODE; SPECIFIED; METHOD; MEMORY; ALLOCATE
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI

DIALOG(R)File 350:Derwent WPIX

012587880   **Image available**
WPI Acc No: 1999-393987/199933
XRPX Acc No: N99-294411
   Hash value generating method in garbage   collected **heap of computer memory**
Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: SCHWARTZ D C; UNGAR D M
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5911144	A	19990608	US 97842140	A	19970423	199933	B

Priority Applications (No Type Date): US 97842140 A 19970423
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5911144	A		43	G06F-017/30	

Abstract (Basic): US 5911144 A

NOVELTY - After determining the hash value, the contents of global hash value is increased from zero to the size of creation area. In order to generate a hash condition, an object oriented technique is invoked and hash value is determined.

DETAILED DESCRIPTION - Hash value for a node (503) contained in creation area (501) is determined by adding the contents of node address contained in node **pointer** (505) and a global hash **offset** variable (507). INDEPENDENT CLAIMS are also included for the following:

(a) hash value generating system;
(b) a computer program product

USE - For generating hash values for nodes initially allocated from a creation area of a **garbage collected** heap in computer memory.

ADVANTAGE - The computer program product for generating a hash value is economical. Provides a data structure that can be simply scanned for pointer values and also simplifies the aspects of instantiated objects in an OOP environment.

DESCRIPTION OF DRAWING(S) - The figure shows the data structures in memory and process of utilizing these data structure for generating hash values.

Creation area (501)
Node (503)
Node pointer (505)
Global hash **offset** variable (507)
pp; 43 DwgNo 5A/10

Title Terms: HASH; VALUE; GENERATE; METHOD; GARBAGE; COLLECT; HEAP; COMPUTER; MEMORY
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI

25/5/22   (Item 16 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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012577817   **Image available**
WPI Acc No: 1999-383924/199932
XRPX Acc No: N99-287422
Live pointer location encoding method in program data stack   frame **for computer system**
Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: AGESEN O; UNGAR D
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5909579	A	19990601	US 97847770	A	19970423	199932	B

Priority Applications (No Type Date): US 97847770 A 19970423
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5909579	A		17	G06F-009/44	

Abstract (Basic): US 5909579 A
NOVELTY - Live pointer locations in program data **stack frame** is computed at each boundary of sequence of byte-codes, and stored at selected boundaries. Any changes caused to the stored locations caused by each byte-code is encoded and then stored.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:
(a) live pointer location encoding apparatus;
(b) computer program product;
(c) **garbage collection** method for computer

USE - For encoding live pointer location in program data **stack frame** for computer system.

ADVANTAGE - Live pointers are located on computer systems which do not accommodate tagged data representations. There is no need for on-demand computation of live pointer information. Live pointer

information need not be stored for all byte-codes. Implementation in both object oriented and non-object oriented systems, single threaded and multi-threaded systems with multiple program stacks are enabled.
    DESCRIPTION OF DRAWING(S) - The figure illustrates portion of byte-codes stream with full live pointer information stored for byte codes located at predetermined intervals and delta coded information stored for byte-codes between predetermined intervals.
    pp; 17 DwgNo 2/5
Title Terms: LIVE; POINT; LOCATE; ENCODE; METHOD; PROGRAM; DATA; STACK; FRAME; COMPUTER; SYSTEM
Derwent Class: T01
International Patent Class (Main): G06F-009/44
File Segment: EPI

 25/5/23   (Item 17 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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012384602   **Image available**
WPI Acc No: 1999-190709/199916
XRPX Acc No: N99-139465
  Data processor with localized memory reclamation
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS AB (PHIG); US PHILIPS CORP (PHIG)
Inventor: HOULSDWORTH R J; HOULDSWORTH R J
Number of Countries: 021 Number of Patents: 007
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9910811	A1	19990304	WO 98IB1087	A	19980716	199916	B
EP 938706	A1	19990901	EP 98929599	A	19980716	199940	
			WO 98IB1087	A	19980716		
JP 2001504970	W	20010410	WO 98IB1087	A	19980716	200128	
			JP 99514094	A	19980716		
KR 2000068812	A	20001125	WO 98IB1087	A	19980716	200130	
			KR 99703489	A	19990421		
US 6304949	B1	20011016	US 98138780	A	19980824	200164	
US 20010039609	A1	20011108	US 98138780	A	19980824	200171	
			US 2001866819	A	20010529		
US 6557091	B2	20030429	US 98138780	A	19980824	200331	
			US 2001866819	A	20010529		

Priority Applications (No Type Date): GB 9717715 A 19970822
Patent Details:

Patent No	Kind Lan Pg	Main IPC	Filing Notes
WO 9910811	A1 E 24	G06F-012/02	

    Designated States (National): JP KR
    Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE

Patent No	Kind Lan Pg	Main IPC	Filing Notes
EP 938706	A1 E	G06F-012/02	Based on patent WO 9910811

    Designated States (Regional): DE FR GB IT

Patent No	Kind Lan Pg	Main IPC	Filing Notes
JP 2001504970	W 28	G06F-012/00	Based on patent WO 9910811
KR 2000068812	A	G06F-009/46	Based on patent WO 9910811
US 6304949	B1	G06F-012/02	
US 20010039609	A1	G06F-012/12	CIP of application US 98138780
US 6557091	B2	G06F-012/02	CIP of application US 98138780
			CIP of patent US 6304949

Abstract (Basic): WO 9910811 A1
    NOVELTY - At the conclusion of each thread memory **stack   frame** , an associated reference buffer which holds pointers to each data object referred to by a respective **stack   frame** , and which has been assigned to a respective memory **stack   frame** , together with each referenced data object having no pointers to it in any other reference buffer are cleared by the processor.
    DETAILED DESCRIPTION - A processor is coupled with a memory containing data objects, each stored at a known memory location and access via pointers carried by memory stacks associated with respective

threads. The processor periodically determines and deletes the data
objects having no extant pointers from any source. A number of
reference buffers are each assigned to a respective memory **stack
frame** , and each holds pointers to each data object referred to by a
respective **stack frame** . At the conclusion of each thread memory
stack frame , the associated reference buffer and each referenced
data object having no pointers to it in any other reference buffer are
cleared by the apparatus. An INDEPENDENT CLAIM is included for a method
for memory management.

    USE - Memory compression and **garbage collection** in real or
virtual memory space for handling multithread programs.

    ADVANTAGE - Increases efficiency by distributing processing load
typically involved in **garbage collection** in multithreading
environment.

    DESCRIPTION OF DRAWING(S) - The drawing shows functional
relationships between general memory and reference stacks.

    Data objects (DO)

    Stack frames (SF)

    Reference stacks (RS)

    Random-access memory (HM)

    Per-thread reference table (TT)

    pp; 24 DwgNo 2/7

Title Terms: DATA; PROCESSOR; LOCALISE; MEMORY; RECLAIM

Derwent Class: T01

International Patent Class (Main): G06F-009/46; G06F-012/00; G06F-012/02;
  G06F-012/12

International Patent Class (Additional): G06F-009/44

File Segment: EPI

  25/5/24   (Item 18 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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012127923   **Image available**

WPI Acc No: 1998-544835/199847

XRPX Acc No: N98-424254

  Computer controlled method optimising garbage   collection **operation -
optimises** garbage   collection **on several elements based on pointer
data parameterisation with 1st changed element index giving pointer array
1st modified element, last changed element index giving last modified
element and stride value**

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)

Inventor: BEYLIN B; KNIPPEL R C

Number of Countries: 027 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
EP 874317	A2	19981028	EP 98303013	A	19980420	199847	B
JP 10301837	A	19981113	JP 98111848	A	19980422	199905	
US 5903900	A	19990511	US 97842139	A	19970423	199926	
EP 874317	B1	20010613	EP 98303013	A	19980420	200134	
DE 69800909	E	20010719	DE 600909	A	19980420	200148	
			EP 98303013	A	19980420		

Priority Applications (No Type Date): US 97842139 A 19970423

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 874317	A2	E	48	G06F-012/02	

    Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT
    LI LT LU LV MC MK NL PT RO SE SI

JP 10301837	A		39	G06F-012/00	
US 5903900	A			G06F-017/30	
EP 874317	B1	E		G06F-012/02	

    Designated States (Regional): DE FR GB NL SE

DE 69800909	E			G06F-012/02	Based on patent EP 874317

Abstract (Basic): EP 874317 A

    The method involves parameterising a pointer array dependent on a

programmed loop operation resulting in a pointer data parameterisation
specifying a pattern of pointer assignments associated with the pointer
array. Within the programmed loop operation the several pointer values
are stored into the several elements without marking the card marked
heap within the programmed loop operation.
     The **garbage   collection** operation is optimised on the several
elements dependent on the pointer data parameterisation. This
parameterisation has a first changed element index specifying a first
modified element in the pointer array, a last changed element index
specifying a last modified element and a stride value.
     USE - For optimising **garbage   collection** operation on several
pointer values in **pointer** array in card marked **heap** , with **pointer**
having several elements.
     ADVANTAGE - Provides economical apparatus, method and system and
computer program product for providing enhanced facilities for **garbage
collection** programs.
     Dwg.2/10
Title Terms: COMPUTER; CONTROL; METHOD; OPTIMUM; GARBAGE; COLLECT; OPERATE;
  OPTIMUM; GARBAGE; COLLECT; ELEMENT; BASED; POINT; DATA; CHANGE; ELEMENT;
  INDEX; POINT; ARRAY; MODIFIED; ELEMENT; LAST; CHANGE; ELEMENT; INDEX;
  LAST; MODIFIED; ELEMENT; STRIDE; VALUE
Derwent Class: T01
International Patent Class (Main): G06F-012/00; G06F-012/02; G06F-017/30
File Segment: EPI

 25/5/25   (Item 19 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

011099235
WPI Acc No: 1997-077160/199707
XRPX Acc No: N97-064121
   Garbage   collection , **tail recursion method for stack-oriented
 programming language - involves initiating evacuation process to
 transport out of stack buffer into heap any live data objects found in
 stack buffer**
Patent Assignee: BAKER H G (BAKE-I)
Inventor: BAKER H G
Number of Countries: 001 Number of Patents: 001
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
US 5590332   A   19961231 US 95372514   A   19950113 199707 B

Priority Applications (No Type Date): US 95372514 A 19950113
Patent Details:
Patent No   Kind Lan Pg   Main IPC   Filing Notes
US 5590332   A   54 G06F-009/45

Abstract (Basic): US 5590332 A
     The method involves converting one or more of the application
subprograms into continuation-passing style (CPS) in the stack-oriented
language. the extent and limit points of a stack buffer is determined
on the execution stack of the stack-oriented language. the execution of
the application is commenced such that the initial invocation **stack
frame** is within the limits of the stack buffer. Any of the
CPS-converted subprograms is interrupted when the execution stack
pointer is beyond a limit point of the stack buffer. An evacuation
process is initiated to transport out of the stack buffer into the heap
any live data objects found in the stack buffer. The execution stack of
the stack-oriented language is contracted back to the beginning of the
stack buffer. The execution of the interrupted CPS-converted
subprograms is resumed.
     ADVANTAGE - Provides optimisation without requiring complex
analysis of application using such mutually recursive subprograms.
     Dwg.0/0
Title Terms: GARBAGE; COLLECT; TAIL; METHOD; STACK; ORIENT; PROGRAM;
  LANGUAGE; INITIATE; EVACUATE; PROCESS; TRANSPORT; STACK; BUFFER; HEAP;

LIVE; DATA; OBJECT; FOUND; STACK; BUFFER
Derwent Class: T01
International Patent Class (Main): G06F-009/45
File Segment: EPI

   25/5/26   (Item 20 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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010945839   **Image available**
WPI Acc No: 1996-442789/199644
Related WPI Acc No: 1998-017968; 1998-556990
XRPX Acc No: N96-372889
   **Real-time GCMM for object oriented multi-processor computer system -
   includes object memory with** garbage collection **control unit
   allocating space for object storage and retrieval on request by processor**
Patent Assignee: UNIV IOWA STATE RES FOUND INC (IOWA)
Inventor: NILSEN K D; SCHMIDT W
Number of Countries: 001 Number of Patents: 001
Patent Family:
Patent No   Kind   Date   Applicat No   Kind   Date   Week
US 5560003   A   19960924 US 92994517   A   19921221 199644 B

Priority Applications (No Type Date): US 92994517 A 19921221
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
US 5560003   A   75 G06F-017/30

Abstract (Basic): US 5560003 A
      The **garbage collecting** module includes a memory for storing
   objects. The memory from-space and to-space regions for object storage.
   A word of each object is a header which specifies the size of the
   object and whether it contains **descriptors** . A unit communicates with
   the digital processor(s).
      A **garbage - collecting** control unit allocates space for and
   stores an object in the memory upon request by one of the digital
   processor(s). It further causes an object to be retrieved from the
   memory and returned to one of the digital processor(s) upon request. It
   also **collects garbage** from the memory utilizing the source
   descriptors supplied by the digital processor(s).
      ADVANTAGE - Can be used with wide variety of computers. Provides
   automatic garbage cleaning without causing excessive delays in
   application program execution.
      Dwg.2/73
Title Terms: REAL; TIME; OBJECT; ORIENT; MULTI; PROCESSOR; COMPUTER; SYSTEM
   ; OBJECT; MEMORY; GARBAGE; COLLECT; CONTROL; UNIT; ALLOCATE; SPACE;
   OBJECT; STORAGE; RETRIEVAL; REQUEST; PROCESSOR
Index Terms/Additional Words: GARBAGE; COLLECTING; MEMORY; MODULE
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI

   25/5/27   (Item 21 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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009713706   **Image available**
WPI Acc No: 1993-407259/199351
XRPX Acc No: N93-315230
   Computer system accessible data objects marking method for memory
   garbage collection **- identifying each object in memory by pointer,and
   determining whether each stack entry is pointer or not**
Patent Assignee: MICROSOFT CORP (MICT)
Inventor: ADCOCK J L
Number of Countries: 019 Number of Patents: 005
Patent Family:

Abstract (Basic): EP 574884 A
      The method involves identifying whether each stack entry is
   definitely not a pointer or possibly a pointer. For each new object
   possibly pointed to by a stack pointer that is identified as possibly a
   pointer, the new object is marked as accessible. Each new object that
   is accessible through the marked object is marked as accessible.
      For each old object that is pointed to by a pointer in the list of
   pointers, each new object that is pointed to by a pointer contained in
   the old object is marked as accessible. Each new object that is
   accessible through the marked objects is marked as accessible.
      ADVANTAGE - Provides improved **garbage collection** process for
   computer memory that combines advantages of conservative and
   generational **garbage collection** techniques. Identifies inaccessible
   objects in computer memory.
      .d18
      Dwg.9/9

Title Terms: COMPUTER; SYSTEM; ACCESS; DATA; OBJECT; MARK; METHOD; MEMORY;
   GARBAGE; COLLECT; IDENTIFY; OBJECT; MEMORY; POINT; DETERMINE; STACK;
   ENTER; POINT
Derwent Class: T01
International Patent Class (Main): G06F-012/02; G06F-012/08; G06F-012/12
File Segment: EPI

 25/5/28   (Item 22 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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008236775   **Image available**
WPI Acc No: 1990-123776/199016
XRPX Acc No: N90-095975
   **Computer system for collection of garbage with ambiguous roots - has
   heap of storage divided into pages, labelled and allocated with root set
   of hints used to promote, copy and re-allocate pages**
Patent Assignee: NIPPON DIGITAL EQUIP KK (DIGI)
Inventor: BARTLETT J F
Number of Countries: 001 Number of Patents: 001
Patent Family:

Abstract (Basic): US 4907151 A

The **garbage collection** method recovers unused memory in a heap of dynamically allocated storage. A heap of storage is divided into a number of pages and labels as allocated pages where each page in teh heap is allocated for storing program objects. All other pages of the heap are labelled as unallocated pages. A root set of hints are identical which point directly and indirectly to all of the accessible program objects stored in the heap. The program objects store additional hints pointing to other ones of the program objects. The hints include unambiguous **pointers** to program objects stored in the **heap** and ambiguous **pointers** which may or may not point to program objects stored in the heap.

Pages labelled as allocated and pointed to by ambiguous pointers in the root set and in the accessible program objects are labelled as promoted pages. All accessible program objects are copied excepting those in promoted pages, to newly allocated pages in the heap. The steps of labelling promoted pages and copying includes the steps of labelling the promoted pages and newly allocated pages as allocated pages and labelling all other pages in the heap as unallocated pages.

ADVANTAGE - Simplified system. (31pp Dwg.No.7/11

Title Terms: COMPUTER; SYSTEM; COLLECT; GARBAGE; AMBIGUOUS; ROOT; HEAP; STORAGE; DIVIDE; PAGE; LABEL; ALLOCATE; ROOT; SET; PROMOTE; COPY; ALLOCATE; PAGE

Derwent Class: T01

International Patent Class (Additional): G06F-012/00

File Segment: EPI

 25/5/29   (Item 23 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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004032612
WPI Acc No: 1984-178154/198429
XRPX Acc No: N84-132991
 Symbolic language data processing method - having buffer memory storing data of contiguous main memory addresses and accessible at higher speed than main memory
Patent Assignee: SYMBOLICS INC (SYMB-N)
Number of Countries: 015 Number of Patents: 007
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
EP 113460	A	19840718	EP 83112554	A	19831214	198429	B
AU 8322176	A	19840621				198432	
CA 1214283	A	19861118				198651	
IL 70279	A	19870430				198740	
CA 1229682	A	19871124				198751	
US 4887235	A	19891212	US 87129921	A	19871203	199007	
US 4922414	A	19900501	US 87450600	A	19870908	199022	

Priority Applications (No Type Date): US 82450600 A 19821217; US 8778724 A 19870908; US 87450600 A 19870908
Cited Patents: 10Jnl.Ref; A3...8814; No-SR.Pub; US 3611315; US 3701107
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 113460	A	E	133		

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

Abstract (Basic): EP 113460 A

A main memory (MM) is connected on a common Line Bus (LBUS) to which other devices (OD) like peripheral and state units can be connected for intercommunication. The system architecture includes a synergistic combination of the Lbus, microtasking, centralised error correction circuitry and a sync. pipelined memory. The memory includes processor mediated direct memory access.

The architecture also includes stack cache windows with two segment addressing, a page hash table and page hash table cache, **garbage collection** and pointer control. A close connection of the macrocode and microcode enables one to take interrupts in and out of the

macrocode instruction sequences. Also included are parallel data type checking with tagged architecture, procedure call and microcode support.